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ABSTRACT

In this presentation, the author sets forth five assumptions about library/information sciences upon which he bases his argument that library/information education, in order to be effective, and perhaps even to survive, will have to change its goals, content and context. The three general areas of concern in library/information curricula are information, people, and technology. A fourth area which overlays all three is research. Before attempting to design a more pertinent curriculum, a few characteristics of these areas in library/information sciences must be understood: (1) libraries have traditionally been concerned only with the information base--gathering, collecting and organizing, (2) libraries have concerned themselves with only a small portion of the totality of information, (3) the concern with people has been relatively recent, and not very successful, and (4) although technology has always been important in libraries, it is time to move to the next levels--media, computers and telecommunications. It is the interface among these three areas that curricula must be developed. Suggested courses and scopes of each are given. (SJ)

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CURRICULUM DESIGN

FOR

LIBRARY AND INFORMATION SCIENCE

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CURRICULUM DESIGN FOR LIBRARY AND INFORMATION SCIENCE

Robert S. Taylor

Let me start this off by stating some basic assumptions of my own - based principally on observation, experience, and prejudice - a condition which, I guess, approaches wisdom. From these assumptions I hope to show that library/information education, in order to be effective, indeed possibly to survive, will have to change - its focus, its goals, its content, and its context.

My first assumption says that there is a broader geography of interests within which libraries and library science are but a small corner - and that we neglect this larger context at our peril These other interests bear a whole spectrum of labels: information science, instructional technology, communications, computer science, management, media, telecommunications, policy research, etc., etc. Librarians have cut themselves off from this larger more dynamic world, because of their excessive concern with the "how" rather than the "why" or the "what". And library education has reflected this isolation, has allowed library educators to dig little holes of meaningless trivia, which gives us the illusion of significance and cuts us off from

the blooming, changing world outside. The point I wish to make here, however, is that there is a spectrum of concerns, ranging at one end with information services (such as, but not exclusively libraries) through information engineering, to information sciences. I will return to these a little later and attempt to give some flesh to the bones. The important point is that they are all part of one body. Above all, I think we do our students a disservice if we let them think the only place they can work and make a significant contribution is in a building called a library.

My second assumption is related to the first and it concerns the change in the cultural context within which we exist and work. Libraries and other information and communication-oriented institutions grew and matured in an educational culture that was information-poor and experience-rich. Our thinking and our planning are based on the assumptions of that cultural context. These are no longer valid. We are now an information-rich and experience-poor culture. This change has some profound implications for professional education in the information

and communication-oriented fields, and for the information systems and institutions that serve society. In writing about the changes necessary in educational institutions, James S. Coleman states:

> Schools as they now exist were designed for an information-poor society, in part to give a child vicarious experience through books and contact with a teacher. Obviously that function is altered radically by television, radio, and other media outside the school...thus, two aspects of the communication structure of information-rich open societies are destroying two classical functions of the school. Information richness removes the function of the school in extending the child's horizons through vicarious experience; and information pluralism removes from the school the function of shaping the child's values through selectivity. (1)

In speaking of the redirection of goals of the new and developing schools, Coleman further points out:

> One of these goals must be the development of strategies for coping with an information-rich and institutionally complex society. (2)

This sounds familiar and indeed it is, for the idea of information overload keeps cropping up in our own rhetoric; and has for four hundred years. However, the problems we must deal with are far larger, for they have to do with the structure of total social communication and information systems.

The fact of information-richness has at least two consequences. The first is that it alters both the context within which information services exist, and the assumptions and needs of their clientele. For example, traditional information processing institutions, such as libraries, have remained almost static in the percent of patrons served within any particular community. At the same time, many new types of dissemination systems have grown up: the paperback book, the computer network, the telephone as ubiquitous instrument, the technical report centers, closed and open circuit television, audio and video cassettes as personal and reusable storage instruments, and so on. Consequently the traditional forms and institutions have come to occupy a smaller and smaller part of the communications spectrum. This trend will continue. As a result we have institutional and media variety, but an increasing rate of system obsolescence and non-adaptation.

A second consequence of an information-rich culture is that we have not developed filtering mechanisms of sufficient power. We are not yet truly aware of the fact that we as individuals have a fixed amount of attention but a rapidly increasing amount of infor-

mation input. This problem - sometimes called "future shock" - is apparent throughout our culture from the scientific researcher to the ghetto dweller, from the decision-maker to the facilitator of developmental change. As Herbert Simon has pointed out:

> To be an attention conserver for an organization, an information processing system (IPS) must be an information condenser. It is conventional to begin designing an IPS by considering the information it will supply. In an information-rich world, however, this is doing things backwards. The crucial question is how much information it will allow to be withheld from the attention of other parts of the system. (3)

We tend now to solve problems of this type by adding more information processors instead of redesigning systems or asking the basic questions. That is we add more books, compile bigger bibliographies, or add more disc packs to our computer. This is no longer a solution, for it merely increases the rate of overload for the user.

A third assumption has to do with the explosion of information, communication, and media technologies. Institutions based on traditional technologies, such as print, have had a tendency to freeze, with the consequence that, though they may become highly efficient,

they are unable to adapt to the impact of the newer media and their technologies. Newer media, for example, are integrated (if that is the right word) as additions on the older system, without realizing that their dynamic style will demand a different type of dissemination system. But these newer media carry their own dynamic and their mere presence will alter the systems to which they have been attached, for, as E.G. Mesthene points out, "adopting new means in order to better accomplish old ends very often results in the substitution of new ends for old ones." (4) However, this is adaptation by accident and not, as we need, a conscious attempt to understand (at least partially) the impact of newer media and to design for their rational development and exploitation.

We must have, and as educators we must transmit, a far better knowledge than we presently have of the relationship of print, of sound, of image. We must develop integrated systems that can fruitfully amalgamate all media, understanding the place and power of each within the context of all. More than anything we need a sense of process; and this

is most difficult, for what we know as benchmarks in the landscape can no longer be regarded as familiar and authenticated touchstones.

A fourth assumption affecting professional education in the information field results from the increasing change in education itself. Educational opportunities will explode horizontally in space, affording many alternatives to the fixed physical plant of a single institution. What will be the role of libraries and information systems in this context? Education will no longer be the monopoly of the young. Persons of all ages will pass in and out of the educational system throughout their lifetimes. What kinds of information-based institutions and networks are necessary to support such educational functions and dispersals? As Marvin Adelson has pointed out in his superb essay on education in the Conference Board report Information Technology:

> There is evidence of a changing emphasis in education from communication of knowledge to utilization of knowledge - emphasis on "learning to think", on analysis, on problem-solving, on inquiry. But the above arguments suggest a different, equally drastic shift, towards emphasis on developing the ability to create one's own knowledge base. The most "relevant" education is that which leads to the confidence

> that individuals or communities can organize, control, and use their own knowledge bases.
>
> This implies a decentralization of control of knowledge bases and master patterns - not separatism, but what may be called pluralism-in-community. (5)

Is this profession prepared to explore the implications of such a trend for information systems?

Let me briefly restate these points, because I think they have something to say about how we develop curricula.

> - The library and the profession of librarianship is part of a larger geography of interests with which we must be concerned.
>
> - Our information systems and services have been designed for an information-poor culture. Today the assumptions of that culture are no longer valid, at least in this country.
>
> - Our information systems have been concerned with the supply rather than with the filtering of information, with the consequence that we have developed a new form of pollution - information glut.
>
> - We need to develop systems that can fruitfully amalgamate all media - print, sound, image - understanding the place and power of each within the context of all.
>
> - Changes in the educational processes in this country during the next two decades will have profound implications for the design of information systems.

With these as context, let me sketch some ideas for curriculum development. Figure 1 (6), a Venn diagram, basically shows three general subjects of concern - information, people, and technology. There is a fourth area which overlays all of them: research. The following comments are pertinent to this sketch.

1. Libraries have traditionally been concerned only with the information base - that is, with the gathering, collecting, organizing of the artifacts of information.

2. As it turns out, libraries have been concerned with only a small part of the circle of information because they have focused their attention only on the package, a result of the acquisitive syndrome of the middle class culture of the past four hundred years.

3. Our concern with people has been relatively recent, and not terribly successful because the concern has been passive and reactive, rather than dynamic and creative. In fact our concern has been principally with the effect or role of the library on our publics.

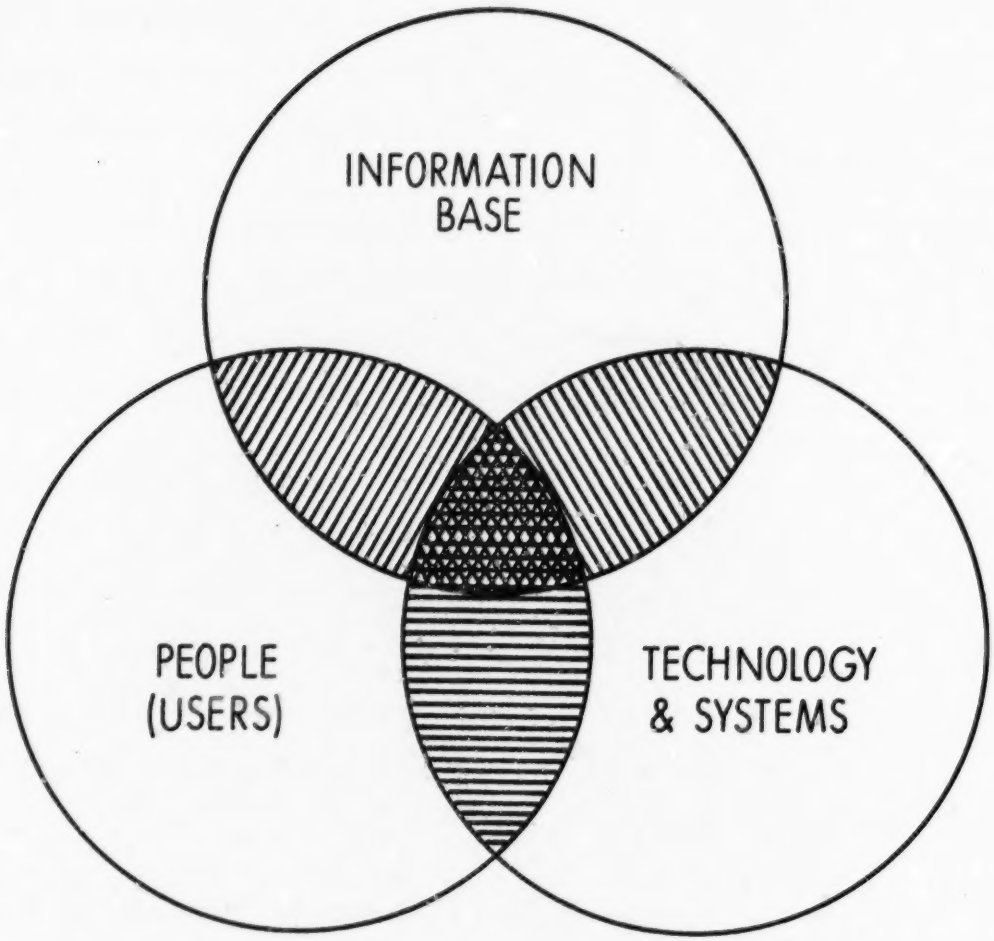

FIGURE 1

We have not asked the more significant question - what is the role of information in the life of society? If we begin to answer that question - and were it in our power to do so - would we really design what know now as a library?

4. Our concern with technology is deep, for libraries are in fact the result of two of the most significant technological developments in human history: the invention of writing and the invention of printing. However, it is now time that we move to the next level of technology, devices and systems which can be grouped generally under the rubrics of media, computers, and telecommunications.

5. It is in the interfaces among these three concerns that curricula must be developed. This is not a task to be accomplished overnight; but I suggest that by 1980 we must, for our survival, be a different educational venture.

In Figure 2 I show a further breakdown of these three areas. By the way, I don't claim that this classification is the only way of viewing the problem. I find it convenient. You may also. But if some other outline fits your psychological set, that's fine - as long as it includes in some way these three basic subject areas. I am not concerned with the elegance of classification here, but rather with a pragmatic way to approach curriculum design. A few comments are pertinent here.

1. The subjects of formats, resources and organization under the general heading of <u>information</u> are rather obvious. I will return to them later. The one strange one is "Filters". Referring back to my earlier remarks and the quotation from Herbert Simon, I think this may be one of the most critical areas during the latter part of this century. We, and our students, know very little about it. We must become interpreters and filters for society. We must find ways of developing self-assurance, judgment, selectivity, empathy, and impeccable fairness in our stu-

dents. I have no easy solution for this and I rather guess the most important variable may be the person in the librarian rather than the librarian in the person.

2. Under "People" I list Environments, Communication, Channels and Change. Environments is the study of contexts - institutional, communities, disciplinary, and what I call the transmission of culture. Communication is the study of process - interpersonal, group, societal: how messages move at various levels of society. Channels is the study of the means by which messages move in society. I have added a possibly curious area called Change. Because I consider the library/information profession at the center of the needed process of change, I believe our students must know the effects of innovation, the prospects of alternative systems, and the processes of technological and social forecasting.

INFORMATION

- Formats
- Sources & Resources
- Levels of Sophistication
- Organization
- Filters

PEOPLE

- Environments (contexts)
- Communication (process)
- Channels (community & individual)
- Change

TECHNOLOGY

- Devices
- Systems
- Economics
- Management

FIGURE 2

3. In the third basic area, Technology, sub-areas are rather obvious. But I think a few remarks are relevant. Devices include all the variety of artifacts we use to store information - books, video tapes, computer tapes, microforms, audio-visual formats, etc. The area of Systems is concerned principally with the formal design and analysis of effective combinations of people, machines and messages, the primary purpose of which is the movement of those messages. We are beginning to realize the importance of the third area, Economics, in this process. Information may be thought of as a public good, possibly as critical as matter and energy. We must be concerned with this, for this is truly what we deal with. Our concern with packages has tended to obscure this very important element - the information those packages contain, and its value, relevance, and usefulness in different contexts.

> We must develop valid models of costs and benefits of information and of the institutions and systems that disseminate information.

As I mentioned earlier, these general areas should be embedded in a context of research. This has generally been lacking in traditional library school curricula. All professionals need to know the process of inquiry, the design, analysis - and effects of social research - and experiments, the standards for defining valid problems and evaluating research results, and the limits of knowledge. This means first-rate courses in statistical inference and probability; and especially a sense of what statistical analysis can do, and what it cannot do; what the effects of sampling are; and what conclusions can be drawn from quantitative studies. This sense I think our students must have if they are (a) to utilize and apply, in any fruitful fashion, research results from other fields and (b) if they are to conduct studies in support of decision-making.

Let me present here very briefly some of the courses that could be included under these general

rubrics. I must confess that these are limited, not only by time and space at this moment, but, more significantly, by the state of my own thinking and development. In the first area (see Figure 3) of Information, beginning courses, i.e., cataloging, indexing, and resources, can be presented in good part as self-learning modules. This we must do if we are to make optimal use of the most valuable resource we have - the faculty. These elements are basically skills and fact presentation. They can be learned and tested outside the usual pattern of the classroom. It is not the process of teaching that is important, but rather the process of learning. It is the interpretation, use, and role of these artifacts - catalog card, reference book, index, etc. - that are important. Beyond this beginning base, students should have the opportunity to work on problems of subject analysis and theories of classification, and on questions of automatic syntactic analysis and other areas of linguistic data processing. Of special importance is the subject analysis of visual and audio formats. I do not mean this in the conventional sense of providing conventional subject labels to audio-visual formats, but rather in the sense of visual literacy and pattern recognition.

COURSE TOPICS

INFORMATION

- Cataloging
- Classification Systems
- Subject Analysis
- Classification Theory
- Indexing & Abstracting
- File Organization
- Information Retrieval
- Linguistic Data Processing
- Resources
- Disciplinary Memories
- Visual-aural Formats

FIGURE 3

We do not know very much about this yet, but our students five and ten years from now must be concerned with it. In the area of resources we should be concerned with the sociology of use of formal information systems, with disciplinary and institutional memories, with retrieval systems and with the varieties of services that are growing both from the traditional library and from the surrounding information-rich culture. It is here that we should examine alternative information systems and analyze their effect on the traditional library.

In the second area (see Figure 4), People, we should be concerned that our students know something of the sociology of communication and of the institutions (libraries, industries, public communications, community organizations, services) which bound our information context. Our students should have experiential exposure to group processes and decision making - not studying these as cases but as true experiences where their decisions and acts make a difference, where they have to defend them among their peers. Here also a student should become aware of the effects of innovation on institutions and their processes. This is of critical importance because

COURSE TOPICS

PEOPLE

Group Dynamics
Decision-Making
Sociology of Communication
Information Counseling
Modes of Information Use
Information Transfer
Communications Institutions
Human Information Needs
Diffusion of Innovation
Cultural Effects of Innovation
Transmission of Cultural Values

FIGURE 4

the library/information professional must assume a significant role in the society of the last quarter of this century, or disappear. Whether or not those people come out of library schools will determine our own future and the future of the profession. In this context, our students should also have a social-historical sense of the ways that culture, mores, and patterns of thought are transmitted in print and non-print media. The history of books is not enough. We must study the effect of the book, of printing, of television, of computers in past, present and future societies.

In the third area (see Figure 5), Technology, our students should be aware of all the technologies that impinge on the transfer of information. Of special importance at this time is computing sciences, specifically in the processing of non-numeric data. They should have a working knowledge of the varieties of programming languages, their advantages and disadvantages, and of computer architecture (as that hardware affects system design). Of importance as a part of this technology rubric is the ability to study and analyze operational systems, to design future systems, and to isolate and define the costs of such changes. In an educational

COURSE TOPICS

TECHNOLOGY

- Library Automation
- Computer Information Systems
- Telecommunications
- Instructional Technology
- Reprography
- Printing Technology
- Systems Analysis
- Budgeting & PERT
- Technological Forecasting
- Economics of Information Systems
- Management of Information Systems

FIGURE 5

context, students should be deeply involved in instructional development and educational system design, for it is our students who will have to disseminate, to provide counsel for, and possibly to adjudicate the information packages that are developed for education. The whole area of telecommunications and information networks should be known by our students, together with the legal and political constraints on their operations.

Having reviewed possible courses here, there is undoubtedly a question in your mind - as there is in mine. How do we cram all these courses, skills, knowledges, and attitudes into a one-year curriculum. I think several observations are worth considering.

1. No single school can or should cover in depth all of these subjects. We will have to specialize among the various schools, without losing our generalist base. In law, for example, if one wants to study international law he goes to one law school; if communications law he goes to another school; and so on. He still, however, gets the basic study

of law in all schools. We need to define our core. I have attempted to do it here.

2. We may have to think in terms of more than one year -- 30-36 credit hours. This is honestly a matter that worries me, for it means a fundamental redefinition of the profession. It, however, must become one of our major concerns over the next decade. This implies by the way that traditional areas of librarianship could be left in the hands of para-professionals.

3. We need to recruit a different kind of student into the profession. Instead of letting students be self-selected, because they think this profession a place where they can hide from participation and decision making, we should drastically change our admissions standards and

our recruiting procedures. We should be looking for students who are both numerate and literate, who already have a background in computers and in research methods. We need people who are bright, self-assured, articulate, and tolerant of ambiguity. They are graduating from undergraduate schools, but are not coming to library school. We need to ask why, for we have the potential of being the most exciting and challenging profession. As David Riesman has pointed out the fastest way to change a profession is to change the kind of student who comes into it. We need to make that change soon.

4. In considering the development of curricula, every institution must make a decision on its own general objectives: research, development, or operations. That is to say, what are the capabilities its graduates will have?

What kinds of concerns will they have? Will they work in libraries or similar kinds of institutional information centers? Will they work in a larger social context as information counsellors and brokers? Or will they be concerned principally with the solution to system or research problems? If we wish to put these in the context of general professional thinking, we can categorize these as information science, information engineering, information services. There has been some degradation in the connotative use of these categories in the literature. This paper, however, interprets these categories strictly.

Information science is concerned with the education of persons who will undertake fundamental investigations directed toward the phenomena of message generation, storage, organization,

structure, filters, and transfer. It is important to understand that this research is not necessarily addressed to any particular library or information system problem. Its objective is to explicate, to state, and to test hypotheses relevant to information systems and communication environments.

Information engineering is directed toward the design and testing of devices and systems useful for the solution of actual problems in operating environments. Its principal concerns are the design of experiments and the evaluation of results in operating systems.

Information services, within the spectrum of educational objectives, is directed toward the training of persons for service functions in information centers and other knowledge dissemination systems. Most

library school curricula, for example, presently fall in this category.

Curricula and research programs representing these three objectives have been largely isolated from each other in the past. There is a critical need now to extend and encourage the incipient dialogues that are beginning to take place. This is a continuum, a spectrum of interests and we must seek patterns of similarity, rather than emphasizing differences. This paper attempts to do just that.

5. We need to realize that a marked change in program will not come overnight. What we can do now is plan and develop a base that will allow us to grow and change, without tieing ourselves to a single institution (the library) or a single format (the book). I have attempted to provide a sketch of that process here. To be sure the problems are messy and their solutions may be traumatic, but we have no choice if the profes-

sion is to survive. We must be prepared to take an empirical posture in full knowledge that discernable progress will be slow and at times discouraging.

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